Navy Environmental & Preventive Medicine Unit No. 2
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Medical Force Protection: Haiti

Medical Force Protection countermeasures required before, during, and after deployment to the "area" are as follows:

Major Threats

Diarrhea, respiratory diseases, injuries, hepatitis A and E, leptospirosis, malaria, dengue fever, other arthropod-borne infections, sexually transmitted diseases, heat injury, and leishmaniasis. Raw sewage, industrial wastes, agrochemicals, and salt-water intrusion may contaminate water.

Requirements before Deployment

1. **Before Deploying report to Medical to:**
   a. Ensure your Immunizations are up to date, specific immunizations needed for area: **Hepatitis A, MMR, Polio, Typhoid, Yellow fever, Tetanus (Td), and Influenza.**
   b. If you have not been immunized against Hepatitis A (two dose series over 6 months) get an injection of Immunoglobulin with the initial Hepatitis A dose.
2. **Malaria Chemoprophylaxis:** Risk in all areas of Haiti.

Must include Primaquine terminal prophylaxis (see "Requirements after deployment")

   a. **Chloroquine** 500 mg/week 2 weeks prior to entering Haiti, and until 4 weeks after departure.
   b. **Mefloquine** 250 mg/week 2 weeks prior to entering Haiti, until 4 weeks after departure
   c. **Doxycycline** 100 mg/day 2 days prior to entering Haiti, until 4 weeks after departure.

3. **Get HIV testing if not done in the past 12 months.**
4. **Make sure you have or are issued from unit supply: DEET, permethrin, bednets/poles, sunscreen and lip balm. Treat utility uniform and bednet with permethrin.**

Requirements during Deployment

1. Consume food, water, and ice only from US-approved sources; **"Boil it, cook it, peel it, or forget it"**.
2. Involve preventive medicine personnel with troop campsite selection.
3. Practice good personal hygiene, hand-washing, and waste disposal.
4. Avoid sexual contact. If sexually active, use condoms.
5. Use DEET and other personal protective measures against insects and other arthropod-borne diseases. Personal protective measures include but are not limited to proper wear of uniform, use of bed nets, and daily "buddy checks" in tick and mite infested areas.
6. Minimize non-battle injuries by ensuring safety measures are followed. Precautions include hearing and eye protection, enough water consumption, suitable work/rest cycles, acclimatization to environment and stress management.
7. Eliminate food/waste sources that attract pests in living areas.
8. Avoid contact with animals and hazardous plants.

Requirements after Deployment

1. Receive preventive medicine debriefing after deployment.
2. Seek medical care immediately if ill, especially with fever.
3. Get HIV and PPD testing as required by your medical department or Task Force Surgeon.
4. Malaria terminal prophylaxis: Primaquine 15 mg/day beginning on day of departure from Haiti for 14 days unless G-6 PD deficient.

VECTOR RISK ASSESSMENT PROFILE *(VECTRAP):* Haiti

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1. GEOGRAPHY and CLIMATE: **Area** of 27,750 sq. km (10,714 sq. mi.), or about the size of Maryland. **Cities** - ***Capital*** is Port-au-Prince; ***Other cities*** - Cap-Haitian (65,000). **Terrain** is 75% mountainous. **Climate** is warm, semiarid. Two rainy seasons occur -- April through June and August through October. Rainfall varies from 100 inches in the north to 54 inches in Port-au-Prince.

2. VECTOR-BORNE DISEASES:

a. **Malaria**: Year-round and countrywide (including some urban areas) at elevations under 500 meters elevation (occasional foci may occur at elevations above 500 meters). Peak transmission occurs from September through January, with a secondary peak from April through June. Distribution tends to be focally endemic associated with vector breeding sites. Malaria constitutes a major public health problem in Haiti. The annual number of reported cases is probably an underestimate of the actual total. *Plasmodium falciparum* usually accounts for more than 99 percent of all reported cases; most of the remainder is attributed to *P. malariae*. Prior to the mid-1960s, both *P. vivax* and *P. malariae* infections were more common. Major epidemics have occurred subsequent to hurricanes. Drug-resistant strains of falciparum malaria have not been confirmed from Haiti, and reports of alleged reduced sensitivity to chloroquine remain unconfirmed. The risk of acquiring malaria is considered high without the proper chemoprophylaxis and could result in a serious loss of combat effectiveness.

b. **Dengue fever**: Dengue is endemic countrywide, but primarily in coastal urban areas. Risk is year-round, and elevated from April through September. Recent incidence data are not available. Cases are probably *significantly* under-reported because of a lack of surveillance and laboratory diagnostic capabilities. Dengue virus serotypes 1, 2, and 4 have circulated in the general region during the 1980s and early 1990s. The current risk of epidemic outbreaks is high. An outbreak of dengue among military personnel could cause a serious loss of combat effectiveness.

c. Viral Encephalitides: vectored by several species of mosquitoes, these zoonotic agents usually circulate erratically with only occasional incidental human infections. **Eastern equine and St. Louis encephalitis** (**EEE** and **SLE**) may occur; absence of incidence data on these diseases may be due to lack of laboratory diagnostic capabilities.

Outbreaks of **EEE** have occurred in the neighboring Dominican Republic, and **SLE** virus has been isolated from mosquitoes in Haiti. Potential vectors include *Culex* and *Aedes* species mosquitoes whose larvae are found in a wide variety of habitats from permanent pools to artificial containers, with some tolerant of brackish water, and others, particularly *Culex quinquefasciatus*, are found in highly polluted water.

d. **Filariasis**, caused by *Wuchereria bancrofti*, is found in most regions of the country. Focally endemic in coastal areas, primarily in the north and around the Gulf of La Gonave. During the early 1990's, infection rates of up to 17 and 35 percent were reported from Limbe and Leogane, respectively. Recent surveillance around Leogane indicated an infection rate of 70%.

Filariasis caused by *Mansonella ozzardi* is found along the coastal regions of southern Haiti (infection rates of 31 to 91 percent reported). Because transmission appears related to chronic exposure to infected vectors, the risk of military personnel acquiring filariasis is moderate to low - particularly if personal preventive measures are used.

3. DISEASE VECTOR INFORMATION:

a. *Anopheles albimanus* is the primary malaria vector. It breeds in partially sunlit pools that are often turbid and associated with emergent vegetation. It is a crepuscular feeder; period of greatest activity is 1800-2200hrs. Predominantly exophilic, but it may come indoors to feed. Opportunistic feeder that rests indoors or outdoors.

VECTOR RISK ASSESSMENT PROFILE *(VECTRAP):* Haiti (continued)

b. *Aedes aegypti* is the mosquito vector of dengue. This is a peridomestic mosquito that prefers to breed in artificial containers near human habitations. It is diurnally (i.e., daytime) active and feeds indoors or out, often biting around the neck or ankles. It typically rests indoors after feeding.

c. The vector of filariasis, caused by *W. bancrofti*, is the mosquito *Culex quinquefasciatus*. Larvae of this species are tolerant of heavily polluted water. *C. quinquefasciatus* will breed readily in highly organic water such as that found in latrines, septic tanks, open gutters, roadside ditches, etc. Appears to be the dominant mosquito species in many urban areas.

The vector of *M. ozzardi* is a biting midge, *Culicoides furens*. This species is a very small fly that breeds in salt marshes and is a vicious biter of humans.

4. POTENTIALLY HAZARDOUS ANIMALS

a. Centipedes, scorpions, tarantulas, and black and brown recluse spiders.

5. DISEASE AND VECTOR CONTROL PROGRAMS:

a. Malaria chemoprophylaxis should be mandatory. Consult the Navy Environmental Preventive Medicine Unit #2 in Norfolk, VA (COMM: 757-444-7671; DSN: 564-7671; FAX: 757-444-1191; PLAD: NAVENPVNTMEDU TWO NORFOLK VA) for the current recommendations for chemoprophylaxis.

b. **Yellow fever** immunizations should be current.

c. The conscientious use of personal protective measures will help to reduce the risk of many vector-borne diseases. The most important personal protection measures include the use of DEET insect repellent on exposed skin, wearing permethrin-treated uniforms, and wearing these uniforms properly. The use of DEET 33% lotion (2 oz. tubes: NSN 6840-01-284-3982) during daylight and evening/night hours is recommended for protection against a variety of arthropods including mosquitoes, sand flies, other biting flies, fleas, ticks and mites. Uniforms should be treated with 0.5% permethrin aerosol clothing repellent (NSN 6840-01-278-1336), per label instructions. NOTE: This spray is only to be applied to trousers and blouse, <u>not</u> to socks, undergarments or covers. Reducing exposed skin (e.g., rolling shirt sleeves down, buttoning collar of blouse, blousing trousers) will provide fewer opportunities for blood-feeding insects and other arthropods. Additional protection from mosquitoes and other biting flies can be accomplished by the use of screened eating and sleeping quarters, and by limiting the amount of outside activity during the evening/night hours when possible. Bednets (insect bar [netting]: NSN 7210-00-266-9736) may be treated with permethrin for additional protection.

d. The most important element of an *Aedes aegypti* control program is SOURCE REDUCTION. Eliminating or covering all water holding containers in areas close to human habitation will greatly reduce *A. aegypti* populations. Alternatively, containers may be emptied of water at least once a week to interrupt mosquito breeding. Sand or mortar can be used to fill tree holes and rock holes near encampments.

e. *Aedes aegypti* and *Anopheles albimanus* have been reported resistant to the insecticides DDT, Dieldrin, and Lindane.

f. The malaria vector, *An. albimanus*, is not as affected by repellents as other species. Nevertheless, DEET will lower biting rates.

g. Expanded Vector Control Recommendations are available upon request.

VECTOR RISK ASSESSMENT PROFILE *(VECTRAP):* Haiti (continued)

5. IMPORTANT REFERENCES:

Contingency Pest Management Pocket Guide Technical Information Memorandum(TIM)24. Available from the Defense Pest Management Information Analysis Center (DPMIAC) www.afpmb.org/pubs/tims/ (DSN: 295-7479 COMM: (301) 295-7479). Best source for information on vector control equipment, supplies, and use in contingency situations.

Control of Communicable Diseases Manual-Edited by James Chin. Seventeenth Ed. 2000. Available to government agencies through the Government Printing Office. Published by the American Public Health Association. Excellent source of information on communicable diseases.

Medical Environmental Disease Intelligence and Countermeasures-(MEDIC). January 2002. Available on CD-ROM from Armed Forces Medical Intelligence Center, Fort Detrick, Frederick, MD 21702-5004. A comprehensive medical intelligence product that includes portions of the references listed above and a wealth of additional preventive medicine information.

Internet Sites- Additional information regarding the current status of vector-borne diseases in this and other countries may be found by subscribing to various medical information sites on the internet. At the Centers of Disease Control and Prevention home page subscriptions can be made to the Morbidity and Mortality Weekly Report(MMWR)and the Journal of Emerging Infectious Diseases. The address is www.cdc.gov. The World Health Organization Weekly Epidemiology Report (WHO-WER) can be subscribed to at www.who.int/wer. The web site for PROMED is http://www.promedmail.org/.
Although PROMED is not peer reviewed, it is timely and contains potentially useful information. The CDC and WHO reports are peer reviewed. Information on venomous arthropods such as scorpions and spiders as well as snakes, fish and other land animals can be found at the International Venom and Toxin Database website at http://www.kingsnake.com/toxinology/. Information on anti-venom sources can also be found at that site. Information on Poisonings, Bites and Envenomization as well as poison control resources can be found at www.invivo.net/bg/poison2.html.

USERS OF THIS VECTRAP: Please notify NDVECC Jacksonville, or the appropriate NEPMU, if you acquire any medical entomology information that can be used to update this VECTRAP.

CUSTOMER SURVEY: In order to improve our VECTRAPS we would like your opinions on the quality and quantity of information contained in them. Please take time to fill out the survey which is contained as an attachment and Fax or e-mail your response back to us. Thank you for your cooperation.

ADDITIONAL INFORMATION ON DISEASE VECTOR SURVEYS, CONTROL AND SPECIMEN ID's WILL BE PROVIDED UPON REQUEST.